

Translation

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 0000054180	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP2003/014186	International filing date (day/month/year) 13 December 2003 (13.12.2003)	Priority date (day/month/year) 19 December 2002 (19.12.2002)
International Patent Classification (IPC) or national classification and IPC C07C 263/10, 263/20, 265/14		
Applicant BASF AKTIENGESELLSCHAFT		

1.	This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2.	This REPORT consists of a total of <u>4</u> sheets, including this cover sheet.  <input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).  These annexes consist of a total of <u>2</u> sheets.
3.	This report contains indications relating to the following items:  I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application

Date of submission of the demand 17 June 2004 (17.06.2004)	Date of completion of this report 17 March 2005 (17.03.2005)
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International Application No.

PCT/EP2003/014186

## I. Basis of the report

## 1. With regard to the elements of the international application:\*

- ☐ the international application as originally filed
- ☒ the description:  
pages \_\_\_\_\_ 1-7 \_\_\_\_\_, as originally filed  
pages \_\_\_\_\_, filed with the demand  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☒ the claims:  
pages \_\_\_\_\_, as originally filed  
pages \_\_\_\_\_, as amended (together with any statement under Article 19  
pages \_\_\_\_\_, filed with the demand  
pages \_\_\_\_\_ 1-8 \_\_\_\_\_, filed with the letter of \_\_\_\_\_ 03 February 2005 (03.02.2005)
- ☐ the drawings:  
pages \_\_\_\_\_, as originally filed  
pages \_\_\_\_\_, filed with the demand  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☐ the sequence listing part of the description:  
pages \_\_\_\_\_, as originally filed  
pages \_\_\_\_\_, filed with the demand  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_

## 2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language \_\_\_\_\_ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

## 3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, Nos. \_\_\_\_\_
- ☐ the drawings, sheets/fig \_\_\_\_\_

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\*

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International Application No.  
PCT/EP 03/14186

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. Statement

Novelty (N)	Claims	1-8	YES
	Claims		NO
Inventive step (IS)	Claims	1-8	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-8	YES
	Claims		NO

### 2. Citations and explanations

D1: US-A-5 849 947

1.) Document D1 is considered the prior art closest to the subject matter of claim 1. It discloses (see column 10, line 64, to column 11, line 22) a method for the production and gentle purification of toluylene diisocyanate, from which the method of present claim 1 differs particularly in that the distillation column has a vertical separating wall. The subject matter of claim 1 (and of dependent claims 2-8) is therefore novel (PCT Article 33(2)).

2.) The use of a vertical separating wall in the distillation column results in a product of greater purity.

The problem to be solved by the present invention is therefore understood to be that of providing a method for the production and gentle purification of toluylene diisocyanate having a greater purity.

Document D1, either alone or in combination with another prior art document, does not suggest the use of a vertical separating wall.

Consequently, the subject matter of claim 1 (and of dependent claims 2-8) involves an inventive step (PCT Article 33(3)).

3.) Toluylene diisocyanate is a product which is of interest to industry. The subject matter of claims 1-8 is therefore industrially applicable.

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JC12 Rec'd ST/PTC 07 JUN 2005

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ART 34 AMDT

**THE FOLLOWING ARE THE ENGLISH TRANSLATION  
OF ANNEXES TO THE INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT (ARTICLE 34):**

**Amended Sheets (Pages 8 & 9)**

We claim:

1. A process for preparing isocyanates by reaction of amines  
5 with phosgene in a reactor and subsequent separation of the  
isocyanate from the reaction mixture and purification of the  
isocyanate, wherein the separation and purification of the  
isocyanate is carried out in a column having a pressure at  
the top of 1-950 mbar, preferably 5-50 mbar, particularly  
10 preferably 10-20 mbar, and a temperature at the bottom of  
90-250°C, preferably 120-170°C, particularly preferably  
130-150°C, and the column is operated with countercurrent  
flow of gas and liquid.
- 15 2. The process according to claim 1, wherein the pure isocyanate  
stream is taken off in liquid or gaseous form at a side  
offtake of the column.
3. The process according to claim 1 or 2, wherein the column has  
20 a vertical dividing wall.
4. The process according to any of claims 1 to 3, wherein the  
bottom product from the column still contains isocyanate  
which is depleted in a further apparatus at a pressure of  
25 1-500 mbar, preferably 5-25 mbar, and a temperature of  
100-225°C, preferably 110-140°C, down to a concentration of  
<10% by weight based on the feed stream to the first column.
5. The process according to any of claims 1 to 4, wherein the  
30 column is preceded by a single-stage or multistage  
vaporization.
6. The process according to any of claims 1 to 5, wherein an  
intermediate vaporization is carried out on the column.
- 35 7. The process according to any of claims 1 to 6, wherein a  
flow-through vaporizer, preferably a falling film evaporator,  
long tube evaporator or thin film evaporator, is used as  
vaporizer for the column, the preliminary vaporization and  
40 the intermediate vaporization.
8. The process according to any of claims 1 to 7, wherein the  
column is packed with sheet metal packing, woven fabric  
packing or mesh packing.

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ART 34 AMDT

9. The process according to any of claims 1 to 8, wherein the residence time in the bottom of the column is not more than six hours, preferably not more than four hours, based on the product taken off at the bottom.

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10. The process according to any of claims 1 to 9, wherein the reaction mixture is fed into the lower part of the first column for separating off the isocyanate.

- 10 11. The process according to any of claims 1 to 10, wherein the isocyanate is tolylene diisocyanate (TDI), methylenedi(phenyl isocyanate) (MDI), hexamethylene diisocyanate (HDI) or isophorone diisocyanate (IPDI).

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